

AMATEUR RADIO



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AMATEUR RADIO

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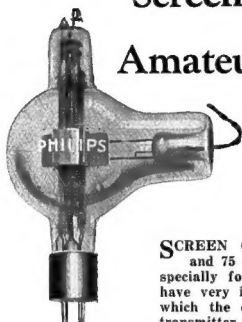
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Screen Grid Valves

For Amateur Transmitters



Types:
QB2/75, QC05/15

quarter of actual size

SCREEN GRID Transmitting Valves for 15 and 75 watts have been designed by Philips specially for use by amateurs. These valves have very important properties, as a result of which the construction and adjustment of the transmitter can be greatly simplified. The control-grid and anode of these valves are screened from each other by a screen-grid, thus reducing anode-control grid capacity to a minimum. When used as H.F. amplifier or frequency multiplier in controlled transmitters there is practically no reaction of the anode circuit on the grid circuit, and self-oscillation is impossible with screening outside the valve. Neutralisation is unnecessary, so it is very easy to alter the wave-length at short notice. These screen-grid valves give greater amplification than triodes under the same conditions.

Table A shows the various electrical properties of the Philips amateur transmitting valves:—

CHARACTERISTICS:

Table A. Type.	Screen Grid Valves	
	QC 05/15.	QB 2/75
Filament Voltage	4.0	10.0
Filament current*	1	3.25
Saturation current*	400	2,000
Anode voltage	400-500	2,000
Screen grid voltage	75-125	300-500
Max. anode dissipation	15	75
Anode dissipation on test	20	100
Max. screen grid dissipation	3	15
Amplification factor*	225	200
Mutual conductance (slope)*	1.4	1.4
Int. resistance*	160,000	150,000
Anode-grid capacity001	.02
Max. diam. of bulb	50	100
Max length	160	210

*Approximate values.

PHILIPS

TRANSMITTING VALVES



Editorial . .

COUNTRY MEMBERS.—Are you availing yourselves of your representation on Council?

You may have a "grouch" against something. A city man can ventilate any grievance at a meeting, and generally leaves the meeting in a better frame of mind than when he entered it, through having the other fellow's point of view explained to him. You are unable to attend meetings, but you have your representatives to speak for you.

Do you keep in touch with your representatives on Council? You have two of them—Mr. Howden, 3BQ, and Mr. Marsland, 3NY, were appointed to look after the interests of the country membership, but they cannot do so unless the country members submit their problems and suggestions to them.

Of course, being a country member has certain disadvantages — you are unable to bring your technical problems along to a meeting and discuss them with your fellow-members, but you can borrow technical books from the library, although you are expected to pay the postage on same.

Council realise to the full the disadvantages of country members, and wish to extend to them the same privileges as are available to city members. Have you any suggestions for placing the country member on a more equal footing with the city member? If so, send those suggestions to either of your representatives — **MAKE USE OF YOUR REPRESENTATION ON COUNCIL.**

CITY MEMBERS. — Ninety-nine per cent. of city members have no idea of the difficulties experienced by country members. Do you share your privileges with the country member? Remember, he cannot come along to a meeting, and his only means of solving a problem is to contact an-

other ham and either make tests or ask for suggestions as to how the difficulty may be overcome.

Are you one of the fellows who say, "Sorry OM, QRL here," when asked to stand by for tests, and then call CQ-DX five minutes later.

Most of us are far too apt to take for granted the privileges obtained from membership of the W.I.A., but how many times have you brought your problems along to a meeting and had them solved by your more experienced or more technically inclined brother hams.

It is very nice to have your shack wall covered with DX cards, but wouldn't it be a far greater achievement to have spent some time in which you may have worked that elusive South American, in helping some other Ham, who, on account of his distance from other Hams, has been unable to gain as much knowledge as you have.

Perhaps we should endeavour to foster a co-operative spirit between the country and metropolitan Ham, in order to bring about a better relationship and understanding of what each other has to contend with? For instance, the town man has his worries over local QRM, and the country man, with his power problems. All these difficulties make interesting talk, and from them we surely can gain knowledge in every day radio life, and, most probably, actually get somewhere with our experiments. If the two communities got together more, a far stronger bond of friendship would be established, and a sympathetic understanding would arise, that would make the two minds think alike, which, in turn, would advance the objects of the W.I.A., "For the amateur; by the amateur."

N.S.W. Progress on Ultra Highs

By E. B. Ferguson—VK2BP.

The five metre field has, in the past, been little explored in Australia, and for some considerable time, the best of gear was capable of covering but short distances. This, in itself, was disappointing for many, and resulted in a dropping off in numbers of those interested in the ultra-high frequencies. Still, a few were content to remain and explore the practically unknown.

Taking N.S.W. as an example. Quite a few 5-metre stations have been active during the past eighteen months or so; but never until lately has a greater distance than perhaps twenty miles been covered.

A short time ago VK2NO and VK2WD erected beam antennae, and a test was arranged whereby a car equipped with a 5-metre receiver was to proceed along the main Western

road. The test proved most satisfactory, as signals were heard from each station participating in the test, up to a distance of 50 miles. After this test, a beam array was erected at VK2BP, which is situated some 2500 feet above sea level, and approximately 50 miles in a direct line west of Sydney. A very small transmitter, consisting of a single type 46 tube was coupled to the beam antenna; and immediately an R7 report was received from VK2NO, just over 55 miles distant. Later the same day contact was made with VK2WD (48 miles), and VK2CG (53 miles), strength in each case was satisfactory.

An interesting test was carried out with VK2WD, proving without doubt the necessity of a beam array for what we may term dx. The signals from VK2BP were R7 whilst using

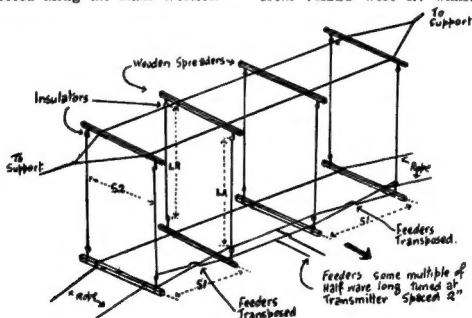


Fig. 1

Frequency MC.	Wavelength Metres.	Antenna Length LA	Reflector Length LR	Int. Spacing SI.	Reflector S2 Antenna to
56	5.357	8 ft. 4 in.	8 ft. 7 in.	8 ft. 9 in.	4 ft. 4½ in.
57	5.263	8 ft. 2½ in.	8 ft. 5½ in.	8 ft. 7½ in.	4 ft. 3½ in.
58	5.172	8 ft. 0½ in.	8 ft. 3½ in.	8 ft. 5½ in.	4 ft. 2½ in.
59	5.085	7 ft. 10½ in.	8 ft. 2 in.	8 ft. 4 in.	4 ft. 2 in.
60	5.0	7 ft. 9 in.	8 ft. 0½ in.	8 ft. 2½ in.	4 ft. 1½ in.

the beam antenna for reception; but when the receiver was coupled to a double aerial, which is most satisfactory for local work, the signals were barely audible. Similarly, signals received at VK2BP were 5 to 6 points stronger when using the beam array for reception, in place of the vertical antenna first erected.

The use of beam aerials now opens up fresh fields on the ultra-high frequencies, and no 5-metre station should be without one. The arrays

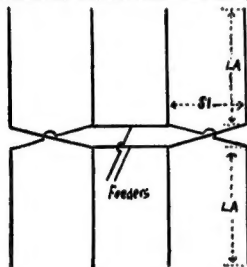


Fig. 2

used so successfully at 2NO, 2WD, 2CG, and 2BP, are described in full in "QST," October 1934. For the benefit of those who have not had that publication, diagrams, measurements, etc., are given.

Fig. 1 shows the construction of the 8-element uni-directional beam. With this type, a highly concentrated in which the heavy arrow points. Although rope supports may be fairly satisfactory, the use of a solid frame-beam is transmitted in the direction

work is recommended, as rope, when wet, will stretch, thereby throwing the array out of alignment.

For those with limited space, a 4-element beam made up similar to the 8-element array, may be erected; the two outside sections being done away with. This will greatly improve range.

Fig. 2 illustrates the bi-directional array. This radiates equally well in two directions, and although it may not have the same concentrating effect of the array in Fig. 1, the difference is only slight. VK2WD used this type most successfully, and is always very strong at this point, just on 50 miles distant.

When erecting an aerial for ultra-high frequency work, whether beam or otherwise, great care must be taken in cutting the wires to the correct length, determined by the frequency on which it is desired to operate. In the case of the beam aerials, a table is given for the various frequencies between 56 mc, and 60 mc.

With the beam aerials described, exceptional results have been obtained in the United States, and there is no reason why they cannot be duplicated in Australia.

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The Cathode Ray Tube and its Application

By the Amalgamated Wireless Valve Company Ltd.*

The future possibilities of the cathode ray tube, and its application in so many fields of experiment, make it an instrument with which all should be familiar.

Briefly, the tube functions in the same manner as a three or four electrode valve, the difference being that the anode is operated at a relatively high potential, giving a high speed electron stream, portion of which shoots through a small aperture provided in the anode plate, and passes on to strike the end-wall of the bulb. Here, due to the coating of a fluorescent material, commonly zinc silicate, the electron "beam" becomes visible, and forms a pattern, which can be focussed to a small spot by the control of the various electrode voltages.

This "beam producing" section of the tube is sometimes called the "gun," and is illustrated in the sketch of a 906 tube in Fig. 1. The remaining section of the tube within the diverging part of the bulb consists of two pairs of plates set at 90 deg., arranged for electrostatic deflection of the electron beam. Electromagnetic deflection can be used, but is usually more complicated in practice than the electrostatic deflection, while the latter can be arranged so that there is no load on the electrical system being examined.

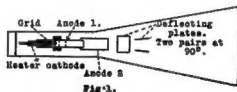
The type 906 tube shown in Fig. 1 is of the heater-cathode type. The cathode is surrounded by a circular shield with central aperture, known as the grid, since it is operated at a negative potential to assist in focussing the beam. Beyond the grid is the first anode with another central aperture. Surrounding and overlapping this anode is the second anode. The first anode operates at approximately one-fifth of the potential of the second anode.

Of the four electrostatic deflecting plates, one of each pair is tied to the anode, which is usually at earth potential, the cathode and heater then being at negative potentials with res-

pect to the earth.

Focussing of the Beam

The tube described is of the high-vacuum type, and focussing of the beam to a fine spot on the screen is accomplished by adjustment of the grid and first anode voltage.



"Soft" tubes containing a small pressure of helium are sometimes used, ionisation in the region of the beam assisting the focussing. However, these suffer from the disadvantages of errors at small deflections and falling sensitivity at higher radio frequencies.

The auxiliary power supply apparatus can be made very simply and a circuit diagram is shown in Fig. 2. The 879 is a high voltage rectifier specially designed for cathode-ray tube requirements. Owing to the small current drain, a resistance-capacity filter is sufficient.

Many applications require the use of a time-base sweep to delineate the voltage being measured upon the screen. This time-base may be linear (requiring special apparatus), or an ordinary 50 cycle voltage may be used to sweep the spot horizontally, when, provided the sweep is large enough, an appreciable portion can be regarded as linear for the examination of wave-forms.

*47 York Street, Sydney, N.S.W.

Linear Time-Base

The circuit of a linear-time base generator is shown in Fig. 3, and in 3a the "saw-tooth" wave-form which is generated. The 885 is used in a gaseous triode. The saw-tooth voltage is generated by the uniform discharging of a condenser C1, C2, etc., and then a sudden discharge when the tube breaks down and suddenly becomes conducting.

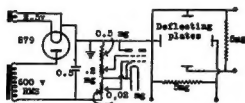


Fig 2..

The 34 pentode is a constant current device to maintain a uniform charging rate for the condenser. Control of the output and frequency is obtained: (1) by using a series of condensers of various capacities; (2) control of grid voltage of gaseous triode; (3) control of grid voltage on pentode 34.

The linear time-base illustrated is a useful device for obtaining the desired wave-forms, but for simplicity of operation, where exact patterns are not required, a 50 cycle time-base is of great value, and does not add much to the cost of the complete instrument. The difference in form of a sine-wave obtained by using a 50 cycle time-base or a linear base is shown in Fig. 4. Over the central part of the 50 cycle sweep, it can be seen that the result is quite reliable, but the two extremes of the sweep must be neglected.

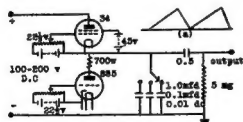


Fig 3.

Application

The cathode ray tube can be used as an indicating voltmeter at all frequencies met with in present R.F.

practice, and since it takes a practically negligible current, can be used out the stages of a transmitter can be measured, and the power output determined by measuring the voltage on very low powered circuits with equal satisfaction. R.F. voltages throughout across a dummy resistance load. For this purpose, the screen is calibrated with D.C. or A.C. voltages, and comparison made with the line traced by the R.F. voltage which represents peak values.

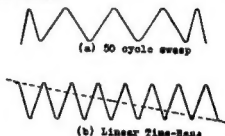


Fig 4.

Of greatest interest to the amateur, and probably the most important application at the moment in the broadcast field is the examination of the depth and linearity of modulation of a transmitter. For this purpose, no time base sweep is required. The audio modulating voltage obtained from a steady signal is applied to the horizontal pair of plates (condenser coupling will be required), and the R.F. output voltage from the modulated amplifier to the vertical plates. The resulting pattern is of the type shown in Fig. 5a when modulation is a moderate percentage. When (a) and (b) are as shown, then:—

$$\text{Percentage Modulation} = \frac{a-b}{a+b} \times 100$$

Linearity of modulation is indicated by the linearity of the line BC. Trouble may be experienced due to phase shift during modulation. This may be overcome by passing the R.F. output voltage to a rectifier and supplying the resulting DC voltage to the vertical plates.

Other depths and conditions of modulation are illustrated in Fig. 5.

From this series of patterns, the variety of faults determinable can be seen. Besides being of use in adjusting the modulator and R.F. amplifier, the cathode ray tube can be kept in use continually as a monitor as any tendency to over-modulate on high audio peaks can be observed.

Continued on page 8

Tube Base "Stand-offs"

Few Hams seem to have realised the possibilities of valve bases as stand-off insulators, plugs, and sockets, etc. Many breeds, of the things, especially those mahogany coloured Mullards, are beautifully made and finished, much better, indeed, than many of the GR type stand-offs on the market. A very neat job can be made by using bases as terminal blocks and power plugs as well as coil mountings—and, best of all at a time like this, many shillings can be saved.

A very brief description should suffice, as once a Ham has the idea, all sorts of ways of using bases will suggest themselves. The writer finds the 4-pin type SG with the terminal block on top of the bulb, ideal as this bakelite block can be used to give a finish to the job.

Continued from Page 9

Other applications of the tube are numerous and varied, while at the present moment it appears likely that the cathode ray system will prove the most satisfactory television receiving device.

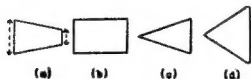
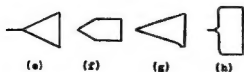


Fig 5.



A suggestion is as follows: Knock bulb off, and clean glass and cement from base and terminal block. Cut prongs off base taking care not to mar polish. The best way to do this is to saw them off fairly close, then run a 3/16 inch drill right through. The drill has a little tendency to wander going through the hollow pin, and in any case the holes are covered by the terminal block. An attempt at filing almost invariably results in unsightly scratches on the periphery of the base where the terminal block doesn't cover them. Next cut the terminal off the bakelite block flush with the metal, and run a 3/16 inch drill through it. No trouble should be found as the metal is thin and securely fastened in the bakelite. Accurately centre tube base, and drill it 3/16 inch. Now cut a square of bakelite with sides slightly greater than diameter of base, drill a screw hole in each corner, and a 3/16 inch hole in dead centre. Run a 2 inch x 3/16 inch bolt and nut through bakelite square base, and terminal block, and you have an FB insulator. The writer uses hexagon nuts to clamp the parts together and to hold coil on. These are quite neat, but city Hams will probably be able to get nickelled wing nuts for the latter.

For power sockets or the like, drill out the old pins and mount valve leg sockets in the base. Make a square base as for insulators, and bolt tube base to it. If sockets are chosen to fit the pins, a plug can be readily made from another base, by soldering the leads into pins and filling base with wax from old high tension dry batteries. Lead-in insulators, and a host of other similar affairs are possible. If care is taken in choosing a good type of base, accurately centering holes, and cleanly cutting the mounting squares, a really commercial job results.

Where North Meets South

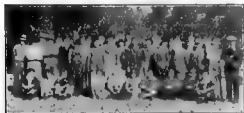
VK7 STAGES A STATE FIELD

DAY.

By 7PA.

As the outcome of an inspiration of some 12 months ago, a committee of three, Messrs. C. Wright (7LZ), C. Parish (7CP), and J. Wallis (7JW), representing the Northern districts, met Messrs. H. Moorhouse (sec.), W. T. Hooker (7JH), and J. Morris, who represented the South, at the club rooms, Hobart, on March 9th last, and as a result, a State Field Day was arranged—the first of its kind in Tasmania—to take place on Sunday, March 31st.

The district of Campbell Town (approx. 80 miles from Hobart), was chosen as a satisfactory area although nearer to the Northern end, the reason being, that the North Western members would be better met for travel distance.



The VK7 Gang

(Pop Medhurst is the guy with the striped tie in the centre.)

The arrangements were well carried out, and the enthusiasm with which the whole affair was accepted is manifest in the muster that resulted. Here I would like to say, that, as all who know him are aware, a big proportion of this success must be attributed to the untiring effort of our very active secretary, and with due credit to the committees that assisted him.

Cars were all at the starting point in time for a line up at 09.45, when those with cameras indulged themselves in photography. Then sealed instructions as to location of transmitter were issued to each car, these for use of unsuccessful searchers, and a start was made.

Weather conditions were perfect, although earlier a heavy fog had made the prospects look bad.

The transmitter was in the hands of 7LZ and 7JW. The 80-metre band was used, and 'phone, the order of the day, the limit being 20 miles radius from the starting point.

The time set out for transmission was 10.00 to 13.00, and a punctual start was made. Unfortunately, either owing to local conditions of some sort or other, or the position of the transmitter itself, signals at the start were nothing more than a very weak carrier, and it proved to be a pretty knotty problem, and although the winning car was in within an hour and a half, most were forced to take full advantage of the time, in fact, the transmission was carried on till 13.05, owing to a couple of the cars being seen approaching the locality at the time scheduled to close down.

The transmitter was situated on the road between Epping Forest and Cressy, approximately 13 miles air line from Campbell Town, with two roads by which it could be approached, one, an open road from Epping; the other, a road from Campbell Town, barred by gates innumerable, much to the annoyance of those who happened that way.

It was not until within about three miles of the transmitter that the modulation became readable, but from then on, the location was easily made.

It was an ideal situation, a small clearing surrounded by low trees of wattle and honeysuckle, good, both as a hiding place and also as a picnic ground.

The transmitter consisted of an Electron Coupled Oscillator 224, and a 59 Power Amp., with 10 watts input, Suppressor Grid Modulator was used, power for the F.F. end was taken from a 500-volt generator,

driven from the rear axle of 7JW's car, the wheel being removed and a pulley fitted in its stead, while the Audio Amplifier and Modulator were battery fed. The outfit was complete even to a grammo. motor, and the microphone was of the P.M.G. variety.

All cars in, lunch was the next on the programme, and all did justice to this very necessary adjunct, which, in some cases, even consisted of grilled chops, done by the use of the camp fire, and with the aid of a forked stick.

Appetites appeased, and a rest taken, cameras were again produced.

A variety of receiving equipment was to be seen, from the detector and one, up to a four valve with an R.F. stage, also, loop aerials of all sorts and sizes, some outside the cars, others inside, directly attached to the receivers, were used.

7CK "landed the bacon" an hour and a half after the start, and this is possibly attributable to some extent to his using an R.F. stage, giving him a better lead off in the early stages when signals were so weak; not wishing in any way to discredit his ability, for he was far ahead of the rest. 7PA was second in for the day, and first for South, others following in fairly close succession.

Our secretary and others, visited Lake Leake, to investigate the possibilities of a fishing excursion—hi!—but owing to it being in the opposite direction to the transmitter, they were nearly late for the kill!

Lunch and photos finished, an hour was spent in general chatter between Northern and Southern gangs, after which, owing to the distance from home, au revours were exchanged, and a start for home was made, each as the mood suited.

There was the variety of incidents usually associated with such gatherings, some amusing, some printable, and others not so printable, as those concerned will recall. Of course, one or two mishaps must be, or things wouldn't be complete; amongst these, one car had to be towed home after an attempt to run without lubrication—another wrecked a couple of wheels and a running board and mudguards, but was fortunate in being able to procure a second spare wheel

in time to take part in the event; these two were the major troubles, others had tyre and other minor troubles.

Federal Headquarters Notes

GRAMOPHONE COMPANY'S REPLY.

The gramophone companies have informed us that their records may be used by amateurs for test purposes as much as any amateur wishes, but they must not be put out in the form of a musical programme, as this, in their opinion, constitutes an entertainment. Fuller details are given by their statement printed elsewhere.

W.A.C. CERTIFICATES.

Several applications have been made for W.A.C. certificates, and these have been accepted, and the I.A.R.U. written to and requested to forward the necessary certificates. Among these applications are:—

VK2DA, VK2HY, VK2LZ (fone), VK3BJ, VK4EL, and VK7JB.

DX CONTEST.

Permission to the Victorian division of the W.I.A. has been granted for them to stage a contest, similar to the recent centenary contest, which was so successful. This is to be held during the month of October this year.

PRESIDENT'S FALL.

The work of the Federal Executive has been interrupted by the fall from grace of the worthy president, VK2HZ, BILL MOORE, who on the 13th April, took unto himself a YF. However, we feel certain that the amateur fraternity wish him the best of luck and happiness. By next month, when his fellow executives have got over the shock, the work of the Federal Executive will be resumed, and we trust by then that Bill VK2HZ will be in a position to attend the usual meetings of the Executive.

Station Description

VK2HP

VK2HP is another pioneer who has watched the growth of amateur radio from the early spark days, and then some! The station is located at Coogee, N.S.W., and is one of a group of six in the same district, and needless to say, QRM becomes very bad when any three of them are on the air together.

VK2HP is conveniently located on top of a high hill, in fact, one of the highest in the district, and commands an excellent view of the sea on one side and of the local panorama on the other. The power used is extremely QRP, but the station gets out all over VK very well indeed. The station is owned and operated by Mr. H. F. Petersen, who is also a Water Board Inspector, and whose son Geoffrey is well known to station 2UE listeners.

The present transmitter is the result of careful planning, and hours of hard work. Rack and panel construction has been adopted as illustrated, the top deck accommodating the RF stages of the transmitter.

The initial RF oscillations are generated in a crystal osc. using a 59, followed by a 46 buffer, driving a UX210 mod. amp. The power input on telephony never exceeds 7.5 watts to the mod. amp. On CW, a fourth tube is employed, being a class B linear amp. employing a Philips TB1/50 running cold at 100 watts.

The next deck down houses the speech input equipment, and a phonograph turntable and pick up. We ask you—does it look compact? The speech amp. has a 75 tube on the voice pick-up, a 609 on the phono. pick-up, followed by two transformer coupled voltage amplifiers using 609's. A Philips eliminator supplies anode power, and an accumulator excites the cathodes.

Power supply and rectifiers for the whole "works" are housed on the following rack. The first three

stages of the transmitter—co, 46, mod amp., and UX250, mod—operate from one supply consisting of two 1561's, delivering 900v at 250ma. This voltage is broken down to suitable values for the various stages through a bank of lamps.

A large power supply, using two 1762's shown mounted on the left-hand end of the deck, serves the Philips 100 watt "Bottle."



Single choke heising modulation is the system employed, and very good quality is radiated on each of the three bands, 20, 40, and 80mx.

Since the photograph was taken, a new receiver has been in operation—a nine tube super of advanced design. The lineup of same reads, 58RF, 2A7 1st det, two 58's int, 2AY 2nd det, 2B7 AVC, 56 1st AF, 2A5 and 5Z3 rec, it brings 'em in alright!

All kinds of antennae have been tried, and the old zepp resorted to. A collins matched impedance network was put into operation with little difference in results.

The address of the station is: "St. Mena," Hamilton Street, Coogee, N.S.W.

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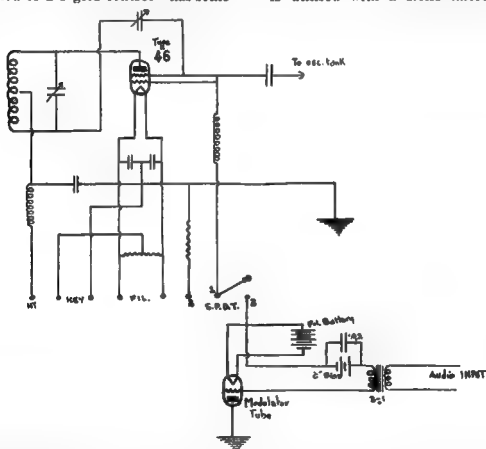
Low Power Modulation

"Telefunken."

By VK3DQ.

There many C.W. Hams who would like to install an inexpensive quick-change-over fone outfit for local rag-chewing, and here is the system that will meet all requirements in that direction. Truly, Telefunken, or, to give it it's correct title—the Schafer Method of DC grid control—has some

At VR3DQ, a M.O.P.A. transmitter is used with a single 46 in the final stage, and a class B amplifier, and this is modulated with a 201a which is excited by a 2-stage speech amplifier consisting of a 57 impedance coupled to a 27. Only a quarter of the gain is utilised with a Reiss microphone



disadvantages, and it is quite useless for the chap who wants 100 per cent. modulation, but then it has several qualities which will appeal to the C.W. gang. In the first place, it is extremely economical, and is easy to construct and operate, and can be used without the addition of an audio-frequency amplifier. A change from C.W. to fone, or vice-versa, can be made by merely throwing a single switch.

driven from 4 volts. All VK states have been worked with an input of not more than seven watts.

Although a maximum of only 85 per cent. is possible with Telefunken, excellent quality can readily be obtained by judicious selection of the audio equipment. It is essential to shield the entire modulator unit as hum is very readily introduced, and feedback often occurs; then, if properly shielded, the unit can be

built into that spare corner of the transmitter rack. If A.C. is used on the filament of the modulator tube, the centre-tap resistor must be true and of good quality to avoid bad hum.

ADJUSTMENT.

First swing the S.P.D.T. switch to position 1-2 for normal C.W. operation, and tune the transmitter for maximum antenna current, then swing the switch to position 1-3, and adjust the bias on the modulator until the antenna current drops to half its original value. This is now the correct working position, and the audio voltage may be fed in.

When the modulator is operating at maximum efficiency, it will be found that a hard-back microphone and a good pick-up will swing the grid satisfactorily. Good modulator tubes for this system are the types 201a, 227, A425, and UX240.

Keying the Crystal Oscillator

For some time now many Hams have been resorting to keying the crystal oscillator as a first step to both the elimination of key clicks and the use of break-in operation. Some chaps have, however, found that the keying is apparently not as clean as it should be, and a slight chirp is heard in the note. Usually this is blamed on to the crystal not being as active as it might be, and so intro-

ducing a slight lag in the starting and stopping of oscillation. In many cases, however, the crystal is not the real cause of the trouble.

In the majority of crystal oscillators using a pentode tube, and most do nowadays, the screen voltage is obtained through a series resistance from the plate supply. When the filament centre tap lead is opened in the usual form of keying, the current stops flowing through the screen circuit as well as through the plate circuit, and so there is no longer a voltage drop across the screen grid resistor, or in other words, the voltage on the screen becomes equal to the plate voltage. When the key is closed, current again flows through the screen resistor, causing the screen voltage to drop down to normal again.

This drop to normal voltage does not take place instantaneously, however, and the slight lag is often the cause of a pronounced chirp in the note. It is obvious, then, that to cut out the chirp, we must keep the screen voltage fairly constant, irrespective of whether current is passing through the circuit or not, i.e., during keying. The most convenient method of accomplishing this is to obtain the screen voltage from a voltage divider rather than from a dropping resistor. Admittedly, this does not keep the voltage absolutely constant, but it is usually quite steady enough to avoid the chirp in the note.

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The Use of Instruments in Modulated Amplifier

The amateur who has been operating a transmitter of proved stability on telegraph signals is often surprised to find that upon the addition of a modulator of approved design, his modulated stage may be quite unstable, give very poor modulation, fail to modulate except at very low percentages, have undesirable harmonics or produce hash in the broadcast band, much to the annoyance of his neighbors. All these troubles often lie in the modulated stage itself, and may persist even though the plate power supply has excellent regulation, the modulator capacity is ample, and the modulation system correct.

When employing plate modulation systems the modulated amplifier must operate over a wide range of power inputs, the reason being that amplitude modulation, as its name implies, is obtained by varying the amplitude of the emitted carrier at modulation frequencies. To obtain 100% modulation, it is necessary to vary the amplitude from zero to twice the unmodulated value. Another way of saying this, is that for 100% modulation the operating plate voltage of the Class C amplifier is varied at modulation frequencies from its normal or no-modulation value down to zero and up to twice its normal value. This voltage variation or modulation is carried out by the modulator circuit. Thus when the amplitude is twice the unmodulated value, the power required is four times the unmodulated value. This means that the tube must function over this range and give a radio output amplitude directly proportional to the audio modulation wave.

With this in mind it may repay us to review the operating conditions in the Class C amplifier, and to discuss the reasons for its use. This may be done easily with the aid of Fig. 1, which gives a picture of the instantaneous relations of tube voltages and currents in the Class C oscillator.

The following conditions are fundamental in this service:

1. The grid excitation, obtained from the

driver or excitation stage is practically pure sine, unmodulated, and swings up and down about the negative or d-c. bias as an axis. On its upward swing the grid is driven past zero, well into the positive potential region, as shown in Diagram A, Fig. 1, and therefore takes electron current.

2. Due to the high value of operating bias, usually twice cut-off, the plate current flows through the tube for only a small fraction of the upward swing of the grid voltage or the corresponding downward half-cycle of the plate voltage, and has the general shape shown in Diagram C, Fig. 1.

3. On account of the "fly-wheel" or "inertia" effect of the tank circuit, the tank r.f. voltage and plate voltages are practically pure sine.

4. It is evident from Fig. 1 that the oscillator efficiency can be increased by supplying the plate current pulse to the tank circuit when the plate voltage is at its lowest value. This means that the oscillating tank voltage is as large as practicable, which for a given antenna load, means that the grid excitation voltage amplitude is large enough to swing the plate to its lowest practical minimum voltage.

What is the limit of increase of this grid excitation? This question can be answered from the characteristic tube curves or experimentally. In the chart of plate characteristics, Fig. 2, we see that as soon as the plate current curves begin to crowd at the left, shown in the dotted lines, an increase in grid excitation produces little or no change in the plate current. This crowding will, of course, vary with the loading of the tube. Experimentally this might be called a quasi-saturated condition. This is shown in the saddling of the plate current curves in Fig 1, Diagram C. If grid excitation is still further increased, the grid current rises abruptly, robbing electrons from the plate, and the plate current saddle becomes very prominent, the power out-

put ceases to increase, and may even decrease.

Thus the excitation for Class C operation must not be so low as to give low efficiency, or so high as to put a heavy load on the driver without contributing measurably to increase in power output.

5. Negative bias for the Class C amplifier can be obtained either from a separate source, from a grid leak of the two. The grid leak and condenser, or from a combination develops a voltage difference due to the leaking off of the charge on the blocking condenser acquired during that fraction of the grid cycle when the grid current flows in the grid circuit. The values of the grid condenser are not critical for ordinary service, although "blocking" of oscillations may occur with very high grid resistors or very large blocking condensers. The combination of self and separate bias is usually used, as it protects low μ tubes against excessive plate current if the radio-frequency excitation should fail.

Adjustment of Modulated Amplifiers.

There is available to the amateur a means of checking the adjustment and operation of his modulated amplifier. He can determine the amount of R.F. power available and make his adjustments so as to produce a 100% modulated carrier. He should first adjust the stage for best efficiency as described in a previous article, "The Use of Instruments in Amplifier and Doubler Stages," part of which is given here.

Briefly, this method of adjustment consists of inserting a low range d-c. milliammeter in series with the choke or grid leak at the ground end. This instrument then reads the rectified component of the radio frequency exciting voltage applied to the grid of the tube from the preceding stage, or, in other words, it is an indicator of the excitation voltage delivered by the preceding stage under load.

This instrument can be used to determine proper neutralizing of the stage in which it is located, to make proper selection of grid leak or choke, and to improve the coupling of the grid to the exciting stage. The methods are given below.

Here is the procedure in neutralizing. Apply the exciting voltage to the stage to be neutralized. Tune the exciting

stage to maximum indication on the grid current indicator. Now change the tank tuning condenser of the stage under adjustment. As you pass through resonance, the reading of the grid indicator will drop (unless you have accidentally set the neutralizing condenser at the proper point). Now continue to swing the tuning condenser through resonance and at the same time slowly change the neutralizing condenser. At some point on the neutralizing condenser, it will be noted that there is no effect on the grid current. This point is the proper setting of the neutralizing condenser. In the course of the adjustment, the grid current may have fallen or increased. This is due to the detuning effect on the tank circuit of the exciting stage. It will be necessary to readjust the tank condenser of the exciting stage during the neutralizing procedure. At all times try to keep the grid current at a maximum by correcting this detuning effect. When no change is noticed on the grid current indicator when passing through resonance, the stage may be considered as properly neutralized. For low power stages, this method is the only one available that will give exact adjustments, and it certainly is extremely sensitive. This method of neutralizing is the same whether the neutralizing be effected through a split plate coil or split grid coil. Keep the tank circuit of the exciting stage in tune at all times.

The next use to which a grid indicator may be put, is the proper selection of the grid leak, or to determine if the choke is operating satisfactorily. If the grid leak is varied, say, from 1,000 to 100,000 ohms, at some point it will be found that the product of the value in ohms times the grid current in value in ohms tunes the grid current in amperes will be a maximum. This indicates the most favorable operating condition.

The choke should preferably be wound so as to have a minimum distributed capacity, and be of such form as to have a small external field. Such a choke would be space wound for high frequencies, and for lower frequencies could be layer wound, but divided into several sections. In either case the choke should be several times longer than its diameter. A long choke is usually less influenced by the surrounding metal parts of the amplifier.

When the choke operates properly it will be found that although the grid current as indicated by the instrument may be somewhat lower, the output of the stage will be higher. It is advisable to insert another grid indicator in the grid circuit of the following stage so that the output of the stage under adjustment may be noted as adjustment proceeds. It is not necessary to apply plate voltage to this following stage since all that is being used is the rectifying action of its grid.

It is also often possible to improve the coupling of the grid to the exciting stage by noting the effect of changing the value of coupling capacity, and choosing one that gives the greatest value.

These adjustments may be quickly made, and when completed will assure getting the most from each stage.

It will be noted that no mention has been made of applying the plate voltage to the stage under adjustment, and this is not necessary except to check the completed adjustment. The application of the plate voltage will cause the grid current to fall, as most of the electrons will not flow through the grid mesh to the plate.

Operating Characteristic Curves.

A simple and satisfactory way of determining whether or not the amplifier is operating properly is to observe the plate milliammeter on the Class C r.f. stage during modulation. If the plate current remains steady during modulation, the amplifier must be operating properly. The modulation will not be straight line if the Class C amplifier plate indicator shows a deflection with application of modulating power. A downward deflection of the milliammeter during modulation will indicate insufficient excitation or wrong bias. An upward kick probably indicates regeneration in the amplifier. A kick either way indicates improper modulation.

The adjustment of the modulated amplifier can be accomplished experimentally by running an operating characteristic curve. Then when the limit of modulation has been determined, the amateur can either correct for low excitation or else reduce the unmodulated plate power so as to be able to produce a fully modulated carrier.

One procedure in determining the operating characteristics of an amplifier which is intended to be modulated is that of actually running a curve of radio frequency output against plate voltage. Provide a means for varying the plate voltage from zero to the normal operating value. This is best done by using a separate plate supply and reducing the primary supply by means of a rheostat, a variable inductor, or an auto-transformer. Adjust this new plate voltage to the value formerly obtained when the stage was

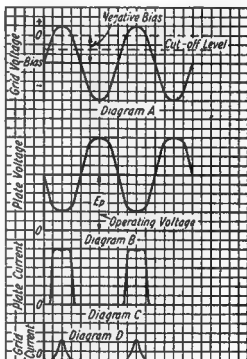


Fig. 1—Fundamental relations in a Class C Oscillator.

unmodulated but the modulators were drawing their load. Note the plate current, the plate voltage, and the antenna or feeder current. Now start decreasing the plate voltage in about ten per cent steps to zero voltage. After each adjustment of plate voltage note the instrument readings mentioned. The range covered is one-half the region over which the stage will operate when subjected to 100 per cent modulation. Now plot a curve of power input against the square of antenna or feeder current, or a curve of the square root of power input against antenna or feeder current. When plotted on cross section paper this curve will be a straight line if the stage is capable of 100 per cent modulation. The other half of the modulation curve, from normal to twice normal

can be taken in the same manner, now increasing the plate voltage in 10 per cent. steps. Extreme care must be taken not to exceed the plate dissipation rating of the tube.

If the curve should rise sharply towards the upper end it is a sign of feedback or regeneration.

A curve that tends to flatten towards the upper end may indicate several things. If the plate current increases uniformly with the plate voltage, the excitation is low. This is usually accompanied by heating of the tube. Should the plate current start increasing rapidly, the tube is probably soft, and the complete test should not be attempted. Should the plate current

become unstable. This practice causes mush and smattering of modulation, and is often heard on nearby broadcast receivers.

If the amateur is unable to make any adjustment that will cause the curve to straighten up, he is limited to the peak power indicated at the point where the curve tends to bend. In terms of percentage modulation this is approximately the per cent. increase of the plate voltage above the normal unmodulated value. As an example, if the plate voltage at this point is 525 volts and the normal value is 350 volts, the per cent. increase would be 50 per cent, and the stage is capable of 50 per cent. modulation without introducing distortion.

It is better to reduce the power input and be able to produce a 100 per cent. modulated carrier than to run with a large input and be able to modulate only 25 per cent. This means better receiver operation, clearer speech and certainly a minimum of interference.

In running the characteristic curve, it is desirable to use a voltmeter having a range about twice the normal plate voltage. When the modulators are disconnected and the chokes shorted out for telegraph service, the plate voltage sometimes increases considerably and there should be no danger of damaging the voltmeter.

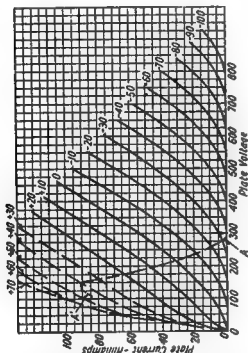


Fig. 3—Characteristic Curves of a transmitting tube.

increase slowly or cease to increase, it is usually a sign of low emission, either due to an old tube or low filament voltage. In case of low filament voltage, a correction should be made and the curve run again.

It is often found that if the readings are continued for still higher plate voltages, the antenna or feeder current may finally indicate a power output four times the unmodulated value. But the modulation characteristic is no longer a straight line. Should one attempt to modulate under this condition the result will probably be serious audio frequency distortion or the stage may

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R. E. JONES, VK3RJ.



QSL NOTES FOR MAY.

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XD, XK, YD, YP, ZJ, ZK, ZL, ZX,
Messrs. Dinan, Nye, Sebire.

This Bureau has just completed its
4th year of existence and the following
statistics may prove of interest:—

Year	Outward Cards Handled	Inward Cards Handled	Total
1931/32	5792	3998	9790
1932/33	9706	8627	18333
1933/34	9157	9529	18686
1934/35	9412	12631	22043
Grand Totals	34067	34785	68852

A further batch of cards is to hand
from FB8VX of the Reunion Island.
His Highness, Prince Vinh-San, has
just recovered from a six months' ill-
ness, and hopes to be active shortly.

Large quantities of cards have
arrived from overseas for unlisted
Victorian stations, and shows that
numbers of pirates are active in this
state. The favorite call signs of the
"pirates" are:—3BP, 3BM, 3EX, 3LA,
and 3ZT. These cards will be handed
to anyone desirous of claiming same, in
the presence of the Radio Inspector.

Mr. S. Hawarth, Melbourne manager
Amalgamated Wireless Valve Co. Ltd.
has come down in the world. Metaphor-
ically only, of course. He has transferred
his offices in the A.W.A. Building in
Queen Street, from the fourth to the third
floor. Mr. Hawarth expressed pleasure
at the response from Victorian amateurs
to the circulars sent out giving designs,
layouts and circuit diagrams. He extends
a cordial invitation to hams to visit him.

Operating and Experimental Section

Conducted by VK3WY.

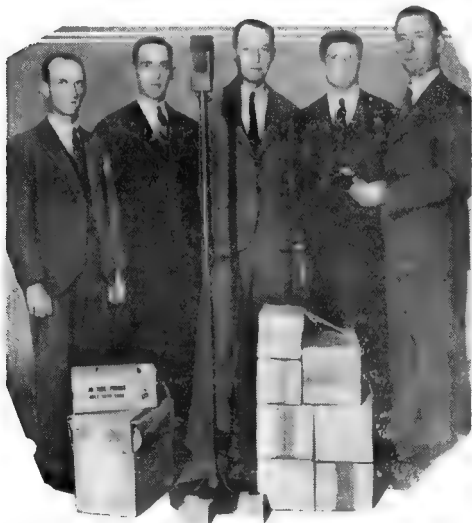
There is very little indeed to write about conditions in the various bands during the last month. The DX season seems to have just about passed now, and conditions generally vary from only average to poor.

3.5mc—Have not heard of any consistent DX on this band, but it is certainly improving, owing to the gradual lifting of QRN.

7mc—Early morning DX is now practically dead on this band, and in the evening, only the usual winter DX, i.e., W, J, KA, OM, XU, and an occasional X is heard.

14mc—There are generally two fairly decent periods on this band at present. These are from 14.00 to 16.00, when W sigs. come through, and from 14.00 to 01.00, when Europeans, and occasional South Africans, may be heard. ZS2B has been heard fairly consistently at this time.

28mc—There was a particularly good burst on this band at the beginning of the month, when W and J were worked with very good signal strength, but these conditions do not seem to be holding.



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Divisional Notes

Association of Radio Amateurs

NORTH SHORE ZONE NOTES A.R.A. (N.S.W.).

By VK2HY.

The past month has provided some real DX thrills on most bands. 80 mx showed up during the first week-end of Yankie test, when W6HXP romped through on fone at R8-9 for three to four hours. He evidently was not worried about working DX, as calls by VK's were unsuccessful. He was using 1.K.W. input, so this accounts for his considerable strength. 40 mx during the ARRL test, was practically useless to those who were not taking part in the contest. 30 mx came to light on the first afternoon of the test, and many VK's secured their 1000 points bonus by contacting on this band. The rest of the week, however, was practically dead. Towards the end of March, European DX has been coming through in the afternoons with W1, 2, 8, etc., at night. 10 mx has been the real surprise. After five years' of comparative quiet, those old faithfuls to this band, were rewarded by some real DX in the shape of W's and J's. W6VQ who uses 1K.W. to self excited rig, was R max for 4 hours on Sunday 31st.

2AE has developed the speed craze, having acquired a "bug." HI! Dave is to be congratulated on his fine performance in the Z.B.R.C. test. It looks like a fight between 2AE and 2LZ for first place. 2DA made a good score in ARRL test. He never seemed to miss on a CQ, and at times dozens of Yanka could be heard calling him. Jack 2HG has been on considerably, evidently has a new xtal on high frequency end of band. We understand 2BA has been transferred to Solomon Islands, so we wish him the best of luck, and hope to contact him shortly.

3LZ has been making and breaking records on 10 mx. Con. was the first VK to contact the East Coast of U.S.A. by working W2TF. Also QSO W4, W9, and about 10 W6's, all on 10 mx. Con. also worked X1AY and J2HJ, J21S, so he has had a great time. 2HY not so successful, as he can only get on for a few hours on Sundays. Managed to work W6VQ, J2HJ, few ZL's, and VK6SA several times. The majority W sigs heard in VK are T9, and operating is usually first class, and it is a real pleasure to work these stations.

2VQ has rebuilt, and is now using link coupling to last stage. His signal varies from T9-some days, to T6 others. 2VG, Rex, has found more time for radio lately, and is heard on quite often. He works a lot with 2HA, who also puts out a very nice T9 sig., and good fone. We understand 2VP is following the example of 2HZ, and getting "spliced" very shortly. Jim 2YC is very excited over conditions on

10 mx. He was rewarded for his patient listening over the past few years, when he worked W6VQ. Jim also worked VK26A, so he has now worked all VK States, ZL and W on 10 mx FB. The last heard from Jim is that his transmitter is giving up the ghost. Must be the shock of working DX on ten after all these years. HI! 2SS has been doing well on 20 mx. Worked OH3NP after many tries. He has an exceptionally nice sig. for S.E., and must get T9 reports from majority QSO's. 2WW been on very little owing to QRL study. He is interested in 10 mx, and often comes to help 2LZ work the DX. 2XC did very well in ARRL test, and should be well up among the leaders. Ian sure puts a hefty sig. over to W, but says S.S. Super necessary for tests. 2FM, 2PV, and 2XC are the only Hams active in Mosman at the moment. 2FM is on fairly consistently, and puts over a good sig. to the States. He is preparing to rebuild his 4-stage xtal rig into a panel job, and judging by reports, it should be the goods. 2PV has been on more often now his Uni. exams are over, and will probably be on during the ZBRC contest. He is having a 10-tube 88 Super built—it's really a necessity for Peter as he gets terrific QRM from 2XC and 2FM. 2XC just arrived back from the bush in time for the Yank. tests, and all the QRM. Both 2EL and 2DA are fairly close by, and both use QRO, but fortunately have very decent T9 sigs. 2EL puts a mighty sig. over to W, and is doing very well in the ARRL contest.

ZONE 8 NOTES.

By VK2OJ.

VK2CP has been here for the past five weeks relieving at the BC station 2AY.

Some of the Albury gang invaded 3EG again last week. The party included 2IG, 2YL, 2CP, 2OJ, and ex marine, op. H. Marshall. VK2QD back in zone 8, but will be heard with a different call sign, as he let his old one lapse. VK2IG will be working on 7000 kc band by the week-end. VK2YI has installed grid modulation, using a 56-tube as a modulator. VK2VF of Corowa, surprised us by a visit last week. He was badly screened and surrounded with AC lines at his old QRA, but new location is fairly clear. 20 mx band fairly active with Q5 sigs. from OH, XU, VU, and W.

LAKEMBA RADIO CLUB NOTES.

(Affiliated with the A.R.A. (N.S.W.))

The meetings of the Lakemba radio club are held every second Tuesday, at the club rooms, 79 Park Street, Canterbury. By the time these notes appear, the annual re-union will have been held. On this occasion it is usual to have representatives from the Radio Inspector's Department (Sydney), the

A.R.A., various radio magazines, and all suburban radio clubs. The evening usually proves a great success, and for the past two years the catering has been conducted in a very excellent manner by Mrs. Picknell. This year, three silver cups will be presented to members as prizes in the recent contests. Prizes will also be available for the visitors.

It is hoped that everybody present will have a good time, and the full details will appear in next month's notes.

Victorian Division

KEY SECTION NOTES.

By VK3YO.

The April meeting of the key section at H.Q. with an attendance of 74, was one of the most successful ever held.

VK3UK gave report on the council meeting with reference to 3WI. The only hitch is the installation of the generator, otherwise the station is almost ready for the air. It is hoped that when 3WI starts operations, it will be used for S.F. transmissions, and the clearing of traffic between divisions. A roster for operators will be needed, and any member who would like to have his name included on the list is asked to get in touch with 3OX.

The 28 mc. contest recently concluded was won by VK3NM, mainly on local contacts, and it is indeed unfortunate that conditions on this band did not come good a week or two earlier, as a fortnight after the test concluded, many VK's worked J's and W's to their hearts' content.

VK3MR gave an interesting discourse on Antennae, after which Mr. Kenna (ex. VK4FK), and Mr. Billin, both from P.M.G.'s research department, demonstrated some wonderful 56 mc gear. Two-way 'phone communication was established with a portable 56 mc transceiver in the street below, and by means of a loud speaker in the meeting room, those present were able to follow the progress of the mobile station, along Queen Street.

The practical manner in which our P.M.G. friends conducted their show, particularly the introductory remarks by Mr. Kenna, captivated the fancy of the meeting, and the whole business was voted a huge success.

After such a demonstration, it should not be long before quite a number of stations are heard on 56 mc.

The number of stations on the various bands since the A.R.R.L. contest seems to have fallen off, particularly on 7 mc, most of the active operators apparently forsaking their keys for sleep. 3YP has held on looking for DX on 14 mc.

3MR was heard calling CX1CG on 3.5 mc.

3ML has now returned to 56 mc where he hopes to get good results, and is installing a beam antenna for this band.

3WG is busy organising S.F. transmissions.

3BQ is now using an 800 as a neutralised P.A. on 28 mc, and has also found that the use of a crystal gate in his S.S. receiver makes the DX signals almost unreadable at this frequency.

3UK has installed his gear in a roll-top desk. He is now building a 56 mc portable, and also a more elaborate outfit for home use. The latter rig will have a rotating beam antenna on the roof.

Our famous country Ham, 3RH, in between servicing nathmatic BCL sets in the bush—apart altogether from trying to kid his baa-lambe to grow two coats of wool per year—has been busy turning out a portable transceiver which will be used mainly for bushfire co-operation work.

A new departure in the notes this month, is the description of an interview with VK3OC at his shack. We hope to publish one interview each month, and perhaps, in this way, we may get some station descriptions from those who are too modest to write their own articles.

With swiftly beating hearts we knocked timidly on the door of the shack. "Come in," called a voice from inside. Gently we opened the door and stepped over a wrecked chassis into the famous operating room. "Is this VK3OC?" we asked, and an affirmative grunt came from the great man himself. "We are representatives from 'Amateur Radio,' and would like an interview with you for publication in the Mag.," we informed him. Sweeping aside a litter of packets, tubes screws, and half-made chassis, our host cleared a space on the couch, and asked us to sit down, whilst he finished off his A.R.R.L. Test Log.

"When did you start operation?" we inquired. Diving under a pile of papers on the desk, he produced his certificate, dated August, 1928. "The station was first operated on 200 meter phone," he told us, and I have now worked right through the bands to successful operation on 28 mc."

"When did you work your first W?" was our next question, and after wading through stacks of QSL cards, he found that it was W9ECZ during September, 1930. "Why don't you put your cards on the wall now?" we asked. "Well there's not much space for them you know, and, at anyrate, the silverfish eat them."

Pop! Pop! went the battery charger, and OC stopped rolling a smoke to adjust the charging rate, knocking over a package of nuts as he did so. The adjustment made, he switched on the X/mittter, and casually lighted his cigarette on the P.A. plate tank.

"I used a TPTG for years," he said, "but now I have built up this 4-stage job consisting of a 47 co., 46 dbir., TCO/4/10 Buffer, and 800 P.A."

At this moment, 3WL walked in, and promptly fell over the chassis in the doorway. Whilst 3OC was pacifying 3WL, we had a chance to look over the X/mittter, which is a wonderful piece of work, built on a relay rack system, with link coupling between stages. The

receiver used is a TRF job, having 6-volt tubes permitting operation on either AC or DC.

We asked 30C how many countries he had worked, and he told us it was about 75, but he had lost count. "I shouldn't wonder," broke in 3WL, "when you stand your battery charger on your log book." "You use telefunken modulation, don't you?" "Yes," he replied, "but I want it placed on record that I prefer loop modulation on self-excited X/mitters." We doubted this, but duly recorded it. "I suppose you don't get many kicks out of working DX now that you are WAC and WBE," said our leader, "tell us, what was your biggest thrill in radio?" "Well," said OC, "it may sound strange, but it was when I heard KDKZ (HI!) on my old SW receiver—which reminds me—it's time for a drink."

After having partaken of some liquid refreshment, we thanked our host, and departed.

GOULBURN VALLEY NOTES.

By 3DW.

Some time ago, we Shepparton Hams put our heads together, and it was proposed that we endeavour to have a space allotted to us in the "MAG."

The first attempt did not meet with success, so once again we try, and trust that this effort will be the commencement of a regular series of notes in the "Mag." each month. (What say Ed.?).

By way of introduction, I might mention the resident Hams, and their various vocations.

3SN—Jack (Dud) Bell—Gives you six or more postal notes to pay your 30/- licence with.

3CN—Snowy Harrison—Listens to the pennies dropping, and counts 'em one by one, at the Bank of Australasia.

3DR—Bill Bennett—Fruity! Eats what he can, and cans what he can't, at the Mooroopna Cannery.

Ex. 3RW—Roy Milledge—Wrestles with a theodolite around the Borough offices, and elsewhere.

3UX—Geoff. Steane—Airs his eloquence over the local BCL station, also twirls the dials.

3FD — Harold Longmore — So far hasn't taken out a licence, so in the meantime chases bugs out of BCL sets.

3DW—Doug. Tacey (The original voice of Shepparton)—Shows the gang the Latest Talkie productions at the Lyric Theatre.

Last, but not least, Alec McBride, second Op at 3SN, and Ex PMG Op, 40wpm artist, and AOPC aspirant, makes those shiny containers for SPC fruit.

Two more Hams we will be reporting on next month, are 3EP Rochester, and 3FN Nathalia. Notes from these Goulburn Valley members not, so far, to hand, but we'll have 'em next time for sure.

3EP—Ted Perkin—Pokes pins into watches, and nickel-plates your tank coils.

3FN—Bern. Ferguson (The Big Noise at the Court House Hotel)—Has a slight "Ale-ment" in his sigs.

And now for the gear in the various shacks:—

3SN—Xmtr Nrl so far used exclusively on 7mc, and for Dud's short time on the air, has raised plenty of DX, details next month.

47CO, 46FD, and 46's, in parallel for PA.

Xmtr Nr2—47CO, 46PA, used on 3.5mc only.

Power supplies, using 280 and 83.

Rx is TRF a la 3WL/30C in June, 1934, Mag. and Dud. swears by it.

Antenna is the usual half wave 7mc Zepp.

3CN Ex 7CH—46 is TNT with both grids tied together, used on 7mc to-date, and used with 7mc Half wave Zepp gets out nicely.

Rx is "Wide World" two AC using 58 and 56.

Power supply from 280 common to Xmtr and Rx.

3DR—At time of writing is wrestling with 3 stage Xtal using 47 CO, 46 FD and PP 210's, input 25 watts (!!!). Also indicates he is trying the FD portion with 46's in parallel.

Power supplies from 280's and 281's. Rx same as 3CN.

Antenna is Half wave 7mc Zepp.

Ex3RW has TRF as per 3WL/30C.

3UX and 3FD are silent members.

3EP and 3FN—No details to hand for this month.

Alec McBride can be heard from 3SN on 7mc Sunday afternoons, and any Ham who is looking for FB QSO, don't forget to call 'em.

3 Doug. W. so far alone on fone, recently installed Xtal mike, and uses it on 3.5 and 1.5mc bands. Keeps the local BCL's amused with canned music on Sundays. ZL reports on 1.5mc very prevalent.

Xmtr Nrl—1.5mc uses 47CO as 210 PA input 12 watts. 250 modulator Single choke Heising, 3 stage speech amplifier.

Xmtr Nr2. 3.5mc is 47CO es 46 PA and used mostly for RAAFWR work.

Well gang, that's QRU for the present, so 73 from GV Hams until next month.

MALLEE NOTES.

By 3WE.

With the last few cool days, conditions in the north have steadily improved, although QRN is still very fierce. The improvement in 20's signals from other VK States—particularly VK4—is most noticeable, but owing possibly to the "Chief" I have heard no 20 or 10's sigs. from VK3. 40's has also improved, particularly in the late afternoons, but is still patchy on the whole. The biggest general improvement is on 80's sigs. from beyond a radius of 250 miles, which have gone up a couple of points at least within the last fortnight. Signals within that radius, however, have commenced to behave somewhat erratically, and to suffer from fast QSB. 3.5 mc has flitted up very rapidly, and on good nights one can hear SE X/mitters slipping up and down the band in the vain hope of finding a clear spot to "parlu the perlu." W & K phones till coming in, but not quite as well as last month, but ZL are easily worked in early evenings (In fact, I worked ZL2MT at midnight—guess he must have suffered from

insomnia). The 3XJ gang, with Mari-byrong Jean, and numerous second ops. still hold the palm for most consistent use of 3.5. Rumour says that Geo. is so "interested" in a certain YL at Eltham, that he works her duplex. Much QRM has also been caused during past weeks by 3WE's impending trip to VIM (Hope the YL's were not disappointed when they saw him). Going out for a marathon QSO, 3ZK, aided and abetted by 5HD and 6KL, put in all the night—7½ hours with power for the three stations aggregating about 20 watts. Jimmy says if this doesn't break the record, he'll have another go.

Half VK must have been listening when the YF at 3WE threw a party, and the OM introduced new talent—a dinky D! Scottish comedienne—to the mike (wot say, 3RG). Requests for invites to the next "do" have been so numerous that the 1st OP will have to hire local town hall.

Stations heard or worked (mostly latter) during the month were: ZL's 4CR, 4CU, 2PD, 2MT, 2BE, 2DC, VK2's ZM, VJ, JA, YW, XT, BK, TA, TC, EX, DF, VK3's XJ, ZK, CE, KR, OR, TL, DW, WN, PW, EP, JO, KE, TM, FW, RZ, EQ, RZ, GM, OS, PL, HT, HG. VK6's GL, QR, KL, HD, WJ, IV, MD. 7's, JW, RC, XL, CK, mostly on 3.5.

Heard little of the celebrations of the Kerang gang, though 3TL has made himself heard on 80, but guess Ken. is still on the DX, and Murray still waiting for that new geucy.

3CH, OC local power station, complains that I harp too much on power house QRM. The retort, of course, is that his remedy is obvious—clean up the QRM.

SHORT WAVE NOTES.

By G. W. MANNING, VK3XJ.

Since last writing, the question of co-operating with the various other sections of the Institute in their experiments on the 56mc bands has been discussed, and am pleased to mention that the group will do everything possible to assist the Hams who will be using this frequency.

A few members of the group have actually had a little experience as to the operation and idiosyncrasies of 56mc transmissions.

Ere these notes are published, the group will have paid a further visit to the transmitting centre of the Amalgamated Wireless Australasia at Graybrook, and no doubt will have gained an idea of what actually takes place in a broadcast station.

Some of the Mallee gang, the most prominent member being 3WE, have signified their intention of being present, and judging from the previous visits which have been paid, everyone should have an enjoyable and interesting evening.

Quite a number of the members have received a small recording from the German short wave station at Zeelson, and have expressed delight at the novelty of it, and also appreciate the gesture by the broadcasting station.

WESTERN DISTRICT NOTES.

3HG—3OW.

3NQ sends first of his promised monthly reports, is using 20 watts on a '45, hoped to raise lots of DX in contest, but found QRM too fierce.

3PG now W.A.C. three times over, with 35 countries worked, and reports up to R8, all with 4 watts on a 201a!!

3KR still works DX between Reserve skeds.

3OR on Reserve work mainly.

3TL chasing bugs from his 'mitter, and is starting to step out.

3KI using two stage xtal rig, with 40 mx xtal, and an RK20 in PA/doubler, and is getting out well.

3XI and 3AC have their 200 metre permits, but haven't heard them here yet.

3JA now has higher power with RV258 in final, and using a 40 mx xtal.

3OW working some DX, but the long wanted South American still eludes him.

3HG on phone almost entirely, except for Reserve work; has lost the DX bug. Recently spent a most enjoyable week touring the northern district of the state, visiting some dozen Hams.

3JE sees enough radio with service work, and is very inactive.

3WW now on C.C.

A newcomer is 3FN in Nathalia, and there should be at least two more new men on soon in this district.

Congratulations and best wishes are extended to 3YL, who entered into married life on April 17th. In the past she has been VK's most active YL operator, and we trust that she will continue these activities from her new QRA. (Congratulations.—Editor).

Queensland Division

On April 5th, the annual meeting of the Queensland division of the W.I.A. was held at the Astoria Cafe.

The meeting commenced at 8 p.m., and an attendance of 40 was recorded, including Mr. Andrews, of P.M.G. Department, and many country visitors.

At the president's table sat: president VK4AW, secretary 4WT, assistant secretary Mr. P. Kelly, treasurer VK4UR, publicity VK4UU, minute secretary, VK4US; Mr Andrews, P.M.G., Mr. Johnstone of the "Courier-Mail."

The members of the council read the reports on their activities for the past year. The T.D.S. report in particular proving extremely interesting, as it contained particulars of the activities of the 56/112 mc group, including the breaking of the Australian distance record of 70 miles, also duplex contacts between two moving 'planes, two moving cars, and the 'plane directing a moving car around the suburbs.

Plans are being prepared for a big 5 metre test up the north coast, about 150 miles.

Amateur Radio

The new council and officers for the new year were elected as following:—
President—A. E. Walz, VK4AW.
Secretary—J. Bates, VK4UR.
Treasurer—W. N. Chitham, VK4UU.
Assistant Secretary—P. Kelly, T.D.S. Advisor.

QSL Officer—C. A. Miller, VK4US.
Councillors—M. Cran, VK4KX; W. T. Wishart, VK4WT; H. Scholz, VK4HR; T. Shorten, VK4TS.

After the election of officers, the feast commenced; after which, the proposal of toasts to the King, P.M.G., Old Timers, and New Hams, etc., were given.

The sumptuous repast was greatly enjoyed by all present, and a general "rag-chow" ensued on the many items of interest to Hams.

Trophies were presented to VK4GK—"Sports and Radio" Cup for the QRP contest.

Pennants to VK4UK, VK4EL, VK4BB, VK4AW, and VK4US.

It was decided that four cups and pennants for 2nd and 3rd places would be awarded for contests during the ensuing year.

Country members were introduced, and many new friendships were established. Those present included: 4WA, 4AH, 4EL, 4LB, 4BB, 4CR, 4WO, 4TS, 4WD, 4NJ, 4HR, 4MM, 4NW, 4JF, 4ZX, 4RJ, 4AP, 4GK, 4UX, 4JY, 4EL, 4HA, 4HB, 4JA, 4KX, 4MC, 4WB, and many students.

If there is any further space, here are some personal para.

VK4BB is down on holidays. Bob should pull off both junior and senior awards in the B.E.R.U. contest, as he got over 12,000 points in both sections. Has also been QSO in Yank. on 28 mc.

4UR, the new secretary, is using parallel 46's T.P.T.G with 30 watts to matched impedance aerial. RX is 4-tube AC, and a swell job.

4LB using P.P. 46's with 30 watts, and a 2-tube electron-coupled AC RX.

4RC now W.A.C., clicked an elusive LU4 on 7 mc. Bob is using 4-stage xtal with pair 46's in P.A.

4UU got 6000 points in Yank. test with his old P.P. 210's.

4US using P.P. 46's, but constructing 4 stage job for VK test. 2A5 C.O. 46 fd. para. 46's Bfr and 825 P.A.

4AP working fb DX with his xtal rig and 800 in P.A.

South Australian Division

By VK6SU—VK6MY.

Conditions on 40 mx not so hot. Few W stations, but more QRN. An old-timer in 3JK comes back to the game, and puts an R8/9 sig. into VK5 at night, on 40 mx.

3EG tearing in—working ZL3AN. ZL3AN ditto few nights.

5LP working few Yanks. now and then on 40 mx.

5KL has no difficulty in raising DX on 20 mx in afternoons.

5LD using telefunken phone on 40

mx, Sundays.

5MY also trying phone, and also listening on 28 mc without success—also QSO'd KAIHR!!

5HG worked a few VK's and 2L's on 28 mc. Heard W6, but reports condition worse. Has now had 931 QSO's with W2CC.

5GR worked ZL on 28 mc.

5FM giving code practice on 7314 KC each night, excepting Tuesdays and Fridays, at 1915 AMT.

5KL and 5MZ on 80 mx phone. Other VK5 Hams preparing for 80 mx for winter QSO's.

Frequency checks from 5WI proving unqualified success. They are getting more QSO's than the rest of the gang put together.

5SU using P.P. grid modulation on F443's, and working a little DX between studies and RAAF work.

W7AYO reports VK signals on 28 mc.

7RC heard on phone one recent Sunday afternoon.

HC1FG heard R8 working F8EO. R7 on 14 mc at 0830 GMT, recently.

5KY now shifted QRA from Victor Harbor so he can get close to 5MY and 5WW!!

PK1VH and PK1BO heard with phone working VK stations, 1BO being particularly good.

Morning DX on 7 mc rapidly dropping off.

Annual general meeting of WIA held recently, three lady members being present, also 5LP, South Australia's unfortunate bed-ridden Ham, who was brought along by several members.

New WIA council for 1935-6:—

Richardson, 5YK, President; Ragless, 5GR; Walker, 5WW; Barbier, 5MD; Peimann, 5JO; Huppats, 5GW; Taylor, 5AT; Howie, 5RF, Hider, and Osman.

5LD new traffic manager.

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R.A.A.F. Wireless Reserve Notes

OUTLINE OF ORGANISATION.

MEMBERSHIP.

The R.A.A.F. Reserve, Wireless Section, is a unit of the Air Force Reserve composed of licensed amateur wireless operators as members. The organisation covers all States of the Commonwealth.

OBJECTS.

1. To train, during peace, a large number of wireless operators whose services would be available to the Royal Australian Air Force in an emergency.
2. To provide channels of communication between Air Force aircraft and their permanent bases when operating at considerable distances therefrom.
3. To form a group of meteorological reporting centres to provide weather data supplementing that available from other sources.
4. To provide information regarding the condition of official and other landing grounds, and seaplane alighting sites.

TRAINING.

1. The training of members is done by W/T. Sufficient material in the way of procedure instruction, books, etc., is provided for home study. Exercises are conducted twice-weekly in each State by means of traffic handling.
2. On occasions, members are called upon to co-operate with the Air Force during flights to distant centres, and thus put their training into actual practice. In this manner, the work is made exceedingly interesting.
3. Members are supplied with Air Force call signs and are allotted special frequencies for Reserve working.

DUTIES AND REQUIREMENTS.

A reservist is expected to devote sufficient time to the Reserve to become proficient in the subjects laid down in the yearly syllabus. This requires approximately 1-2 hours each week of active work on the air. However, the

work has proved to be so interesting to date, that time has been no object to keen and enthusiastic members. The work is neither onerous nor exacting, but provides a field of absorbing interest.

The term of enrolment is four years, but members may resign after 14 days' notice.

PRIVILEGES.

1. Members are supplied with an official log-book, message forms, etc., for use in connection with Reserve work.
2. A lapel badge is issued to each member to identify him as a member of the Reserve.
3. An official membership badge is available for use on stationery.
4. A section of the monthly publication "Amateur Radio" is devoted to Reserve notes and activities.
5. Awards are made in this magazine for traffic handling by Districts, Sections, and individual members. Some attractive trophies are available for contest.

GENERAL CONSIDERATIONS.

The above paragraphs have briefly outlined the purpose and activities of the R.A.A.F. Wireless Reserve. The Wireless Reserve was first formed in 1929 as an amateur body co-operating with the Air Force, and in 1933 it was absorbed into the newly formed Air Force Reserve. Official training commenced on March 1st, 1934.

The Reserve provides something for the amateur that has been wanting for some time—a branch of radio to follow on after his general amateur activities have dwindled owing to lack of interest.

To the country man especially, the Reserve has been a means of constant communication with metropolitan and other country stations. This has been known to be the only reason why several stations have not completely "gone off the air."

ARE YOU A MEMBER?

Subscriptions to the W.I.A. (Victorian Division) are
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Country—Full Member, 14/6; Associate Member, 8/9
Student Member, 7/6. Entrance Fee, 2/6

Write to Secretary, Law Court Chambers, 191 Queen St., City

Traffic handling is something that, for the Australian amateur, is forbidden. As a Reservist, he can engage in this practice, and handle as much Air Force traffic in his section as time will permit. The Reserve is something different—it does not permit the usual amateur conversations because, when a member is operating under his Air Force call-sign, and on an Air Force frequency, he is no longer an amateur—he is a "traffic station," and as such, learns to develop his operating ability in a simple and standard procedure.

ENROLMENT.

Enquiries regarding enrolment should be made to the secretary, Air Board, Victoria Barracks, St. Kilda Road, Melbourne, S.C.1, who will forward the necessary application forms on request.

Australian Engineering Equipment Co. Pty. Ltd. of Evans Holes, 415 Bourke Street, Melbourne, announce that following on their advertisement in our April issue they quickly sold out their stock of Bimbach Insulators.

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